Quarterly Report

Covering January 1, 2006 to March 31, 2006

Submitted April 3, 2006

Project Title

Fish Passage in Montana Culverts Phase II – Passage Goals

Prepared By

Dr. Joel Cahoon, P.E., Ph.D.
Civil Engineering Department, 220 Cobleigh Hall, Montana State University
Bozeman, MT 59715 (406) 994-5961 joelc@ce.montana.edu

Principal Investigators

Dr. Joel Cahoon, P.E., Ph.D.
Civil Engineering Department

Dr. Thomas McMahon, Ph.D.
Fish and Wildlife Science

Otto Stein, Ph.D.
Civil Engineering Department

Jarrett Barber
Math and Statistics

Research Assistants

Jesse Patton, Civil Engineering

Andy Solcz, Fish and Wildlife Science

Introduction

This progress report covers work completed between January 1, 2006 and March 31, 2006. Work on the project during this period has been primarily devoted to preliminary data analysis, and equipment selection and fabrication to add several more antennas.

Project Objective

Culverts are a common and often cost effective means of providing transportation intersections with naturally occurring streams or rivers. Fish passage and fish habitat considerations are now typical components of the planning and design of waterway crossings. Many culverts in Montana span streams that support diverse fisheries. The health of these fisheries is an essential element of a recreational industry that draws hundreds of thousands of visitors to Montana annually. Transportation system planners, designers and managers recognize that fish passage through Montana's culverts is a concern. However, there is much contention concerning the impact that a culvert can have on a fishery. Recent basin-wide studies in Montana (Phase I of this project - final report in November 2004) indicate that the tools that some planners and designers promote for forecasting fish passage concerns may be overly conservative. This is

reflected in the diversity of fish passage goals that are being considered by state agencies in the Northwest. Some managers contend that all culverts should pass all fish at all times, whereas others suggest that this is an unrealistic criterion, particularly during high flow events. Which species, life stages, and how many individuals must have fish passage access for how long, are questions that are often brought forward during discussions on the design and retrofitting of culverts to accommodate fish passage concerns. ***The problem is that for fish species and settings in Montana, the timing and number of fish that must pass a culvert to maintain viable species diversity in the watershed is unknown.***

Progress

A review of field data collected in the 2005 season has resulted in only a slight change in field operations for the 2006 season. In 2005, each of the culverts noted in Figure 1 had two PIT receiver antennas, one at the culvert inlet, and another at the culvert outlet. We have decided to add a third antenna at each culvert just downstream of the outlet plunge pool.

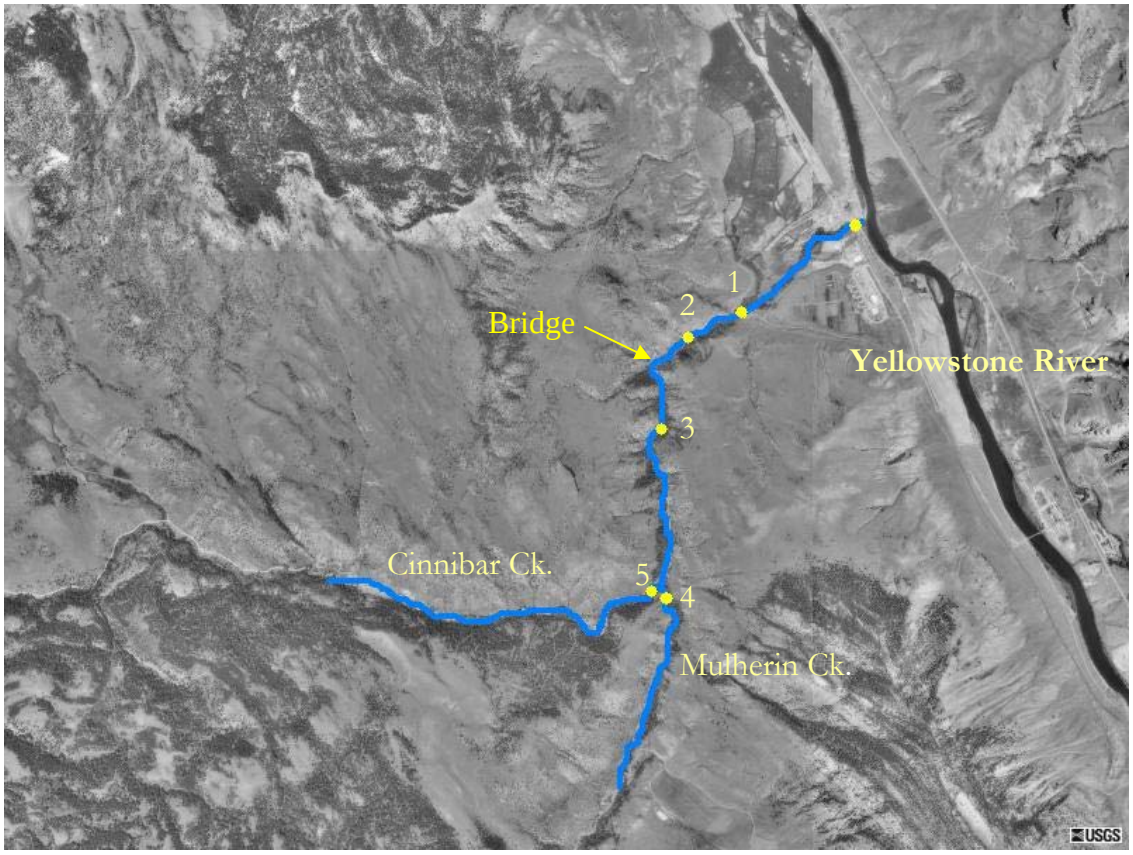

Figure 1. Culvert locations at Mulherin Creek.

The additional antenna will allow us the determine if fish are coming into proximity of the culvert without attempts at passage, and will let us calculate a time-in-residence in the general culvert area.

In addition to the third antenna at each culvert, we have decided to equip the slab bridge that is between culverts 2 and 3 as if it were a culvert. This will help us ground truth passage at the culverts and give us a "control" reach that should be passable at all flows.

Budget

Expenditures for this cycle are largely a result of stipends. The planned and actual expenditures deviate slightly due to a delay in tuition and fee charges to the grant, and because field equipment purchases in March have yet to be applied.